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Akiba et al.

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(54) **NAILING MACHINE**

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B25C 1/04 (2006.01)

(52) **U.S. Cl.** **227/8**; 227/120; 227/136

(58) **Field of Classification Search** 227/8, 120, 227/135, 136, 138, 119
See application file for complete search history.

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(57) **ABSTRACT**

According to an aspect of the present invention, there is provided a nailing machine including: a housing; an ejection section in the housing; an activation lever provided in the ejection section to be movable inside a traveling course; a magazine holding nails; a feeder urging the nails to feed the nails; and an engagement member engaged with the feeder so that, when an amount of remaining nails becomes to a predetermined number, the engagement member is moved toward a first direction to protrude into the traveling course; wherein one of the activation lever and the engagement member includes a slope portion so that the engagement member is further moved toward the first direction through the sliding contact therebetween.

4 Claims, 6 Drawing Sheets

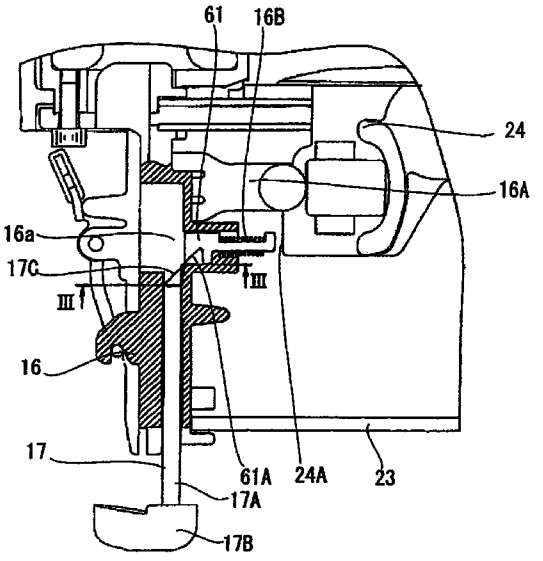
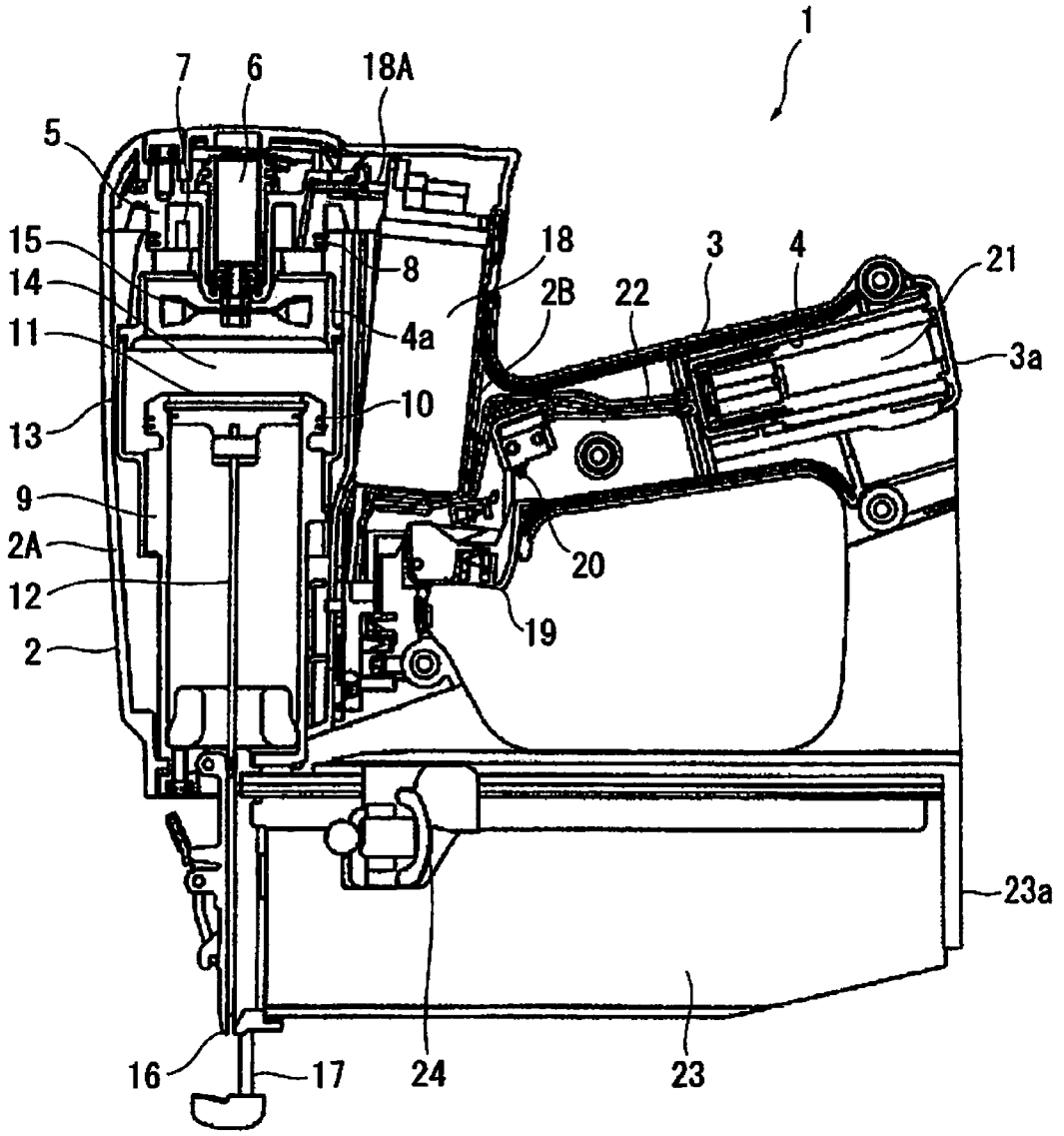


FIG. 1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7
6
18A
5
15
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11
13
9
2A
12
2
8
4a
10
18
2B
22
3
4
21
3a
20
19
23a
16
17
24
23

FIG. 2

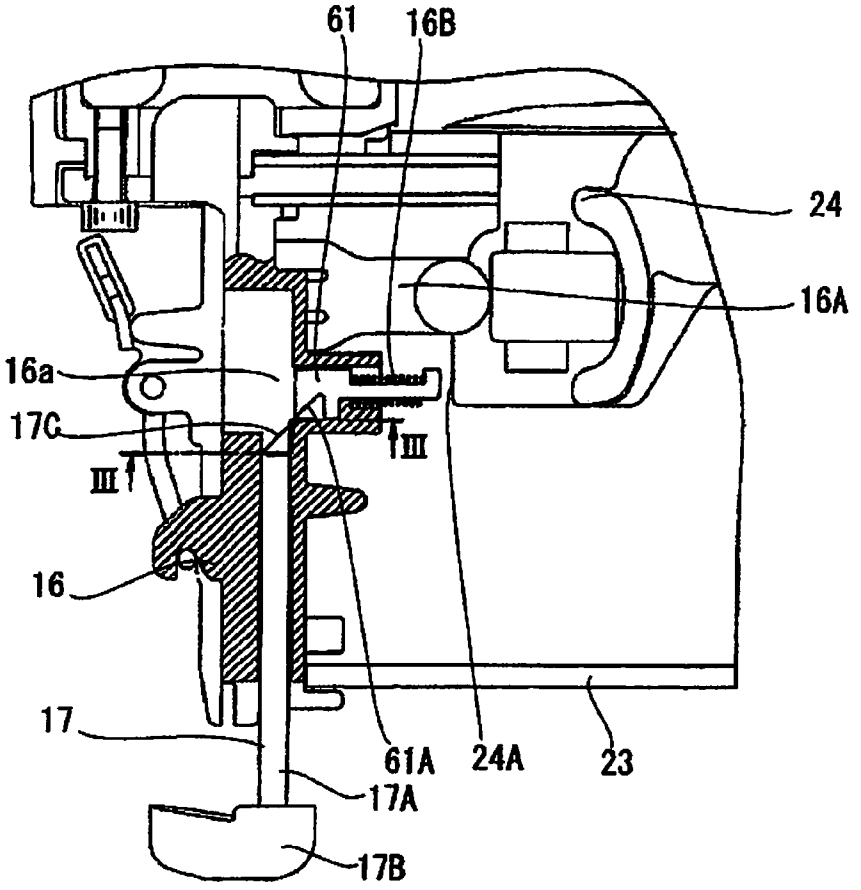

61
16B
24
16A
16a
17C
III
III
16
17
61A
24A
23
17A
17B

FIG. 3

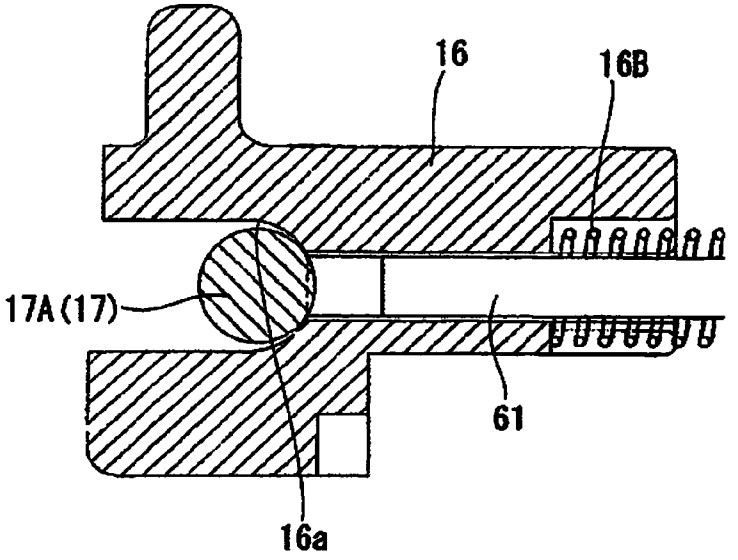

16
16B
17A(17)
61
16a

FIG. 4

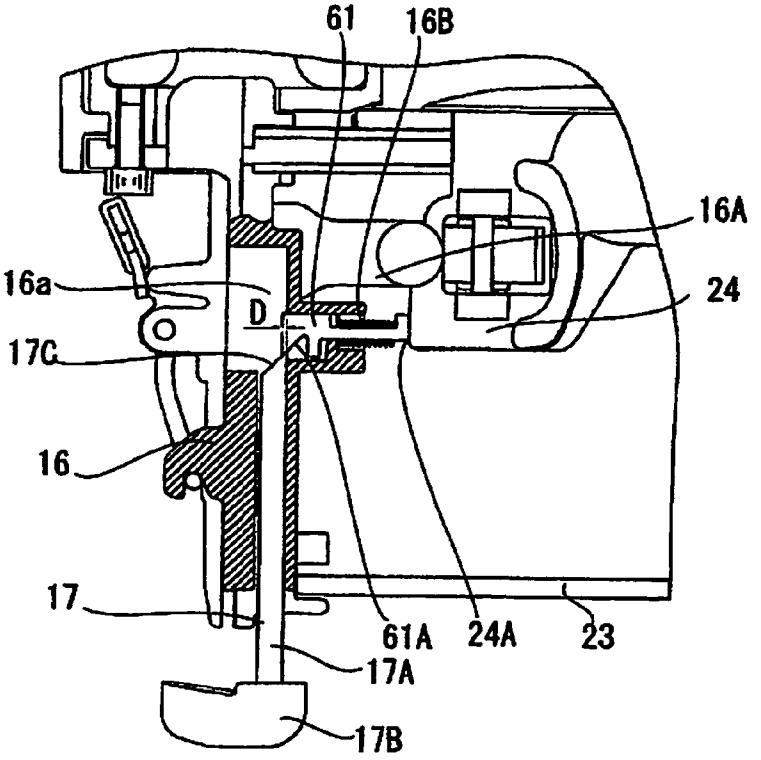
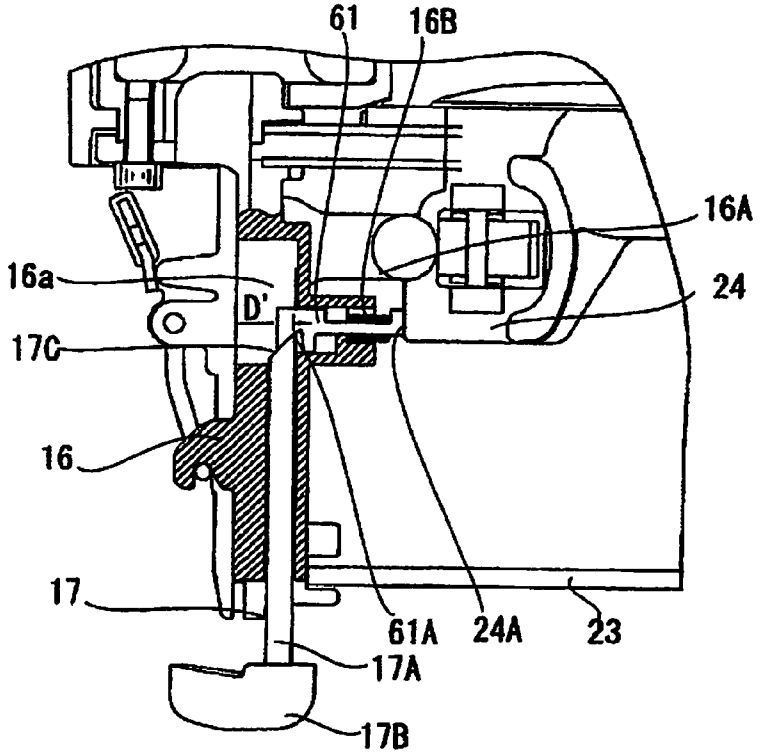

61
16B
16A
16a
D
24
17C
16
17
61A
24A
23
17A
17B

FIG. 5


61
16B
16A
16a
D'
24
17C
16
17
61A
24A
23
17A
17B

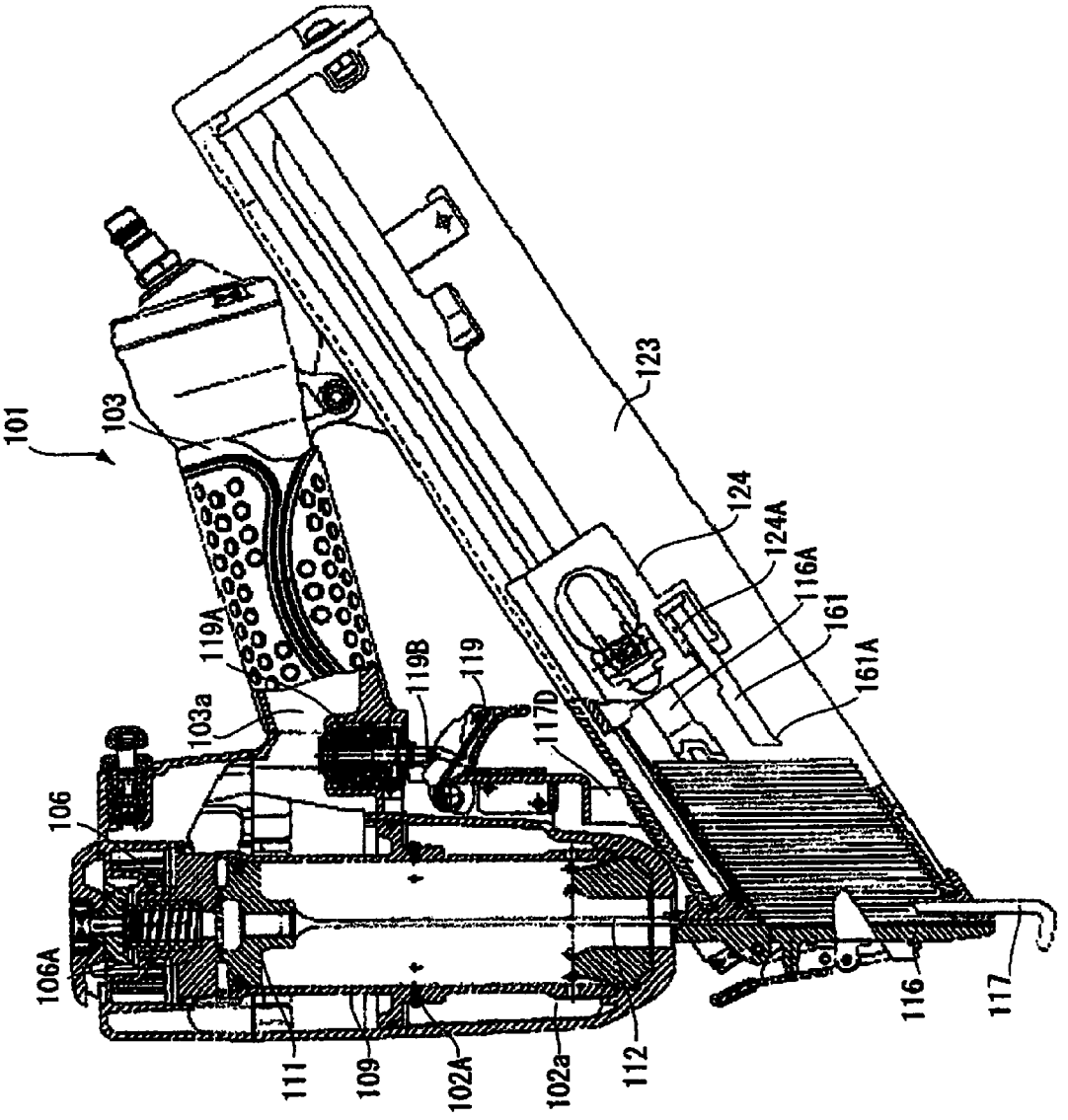

101
103
123
124
124A
116A
161
161A
119A
119B
119
103a
117D
106
106A
111
109
102A
102a
112
116
117

FIG. 6

FIG. 7

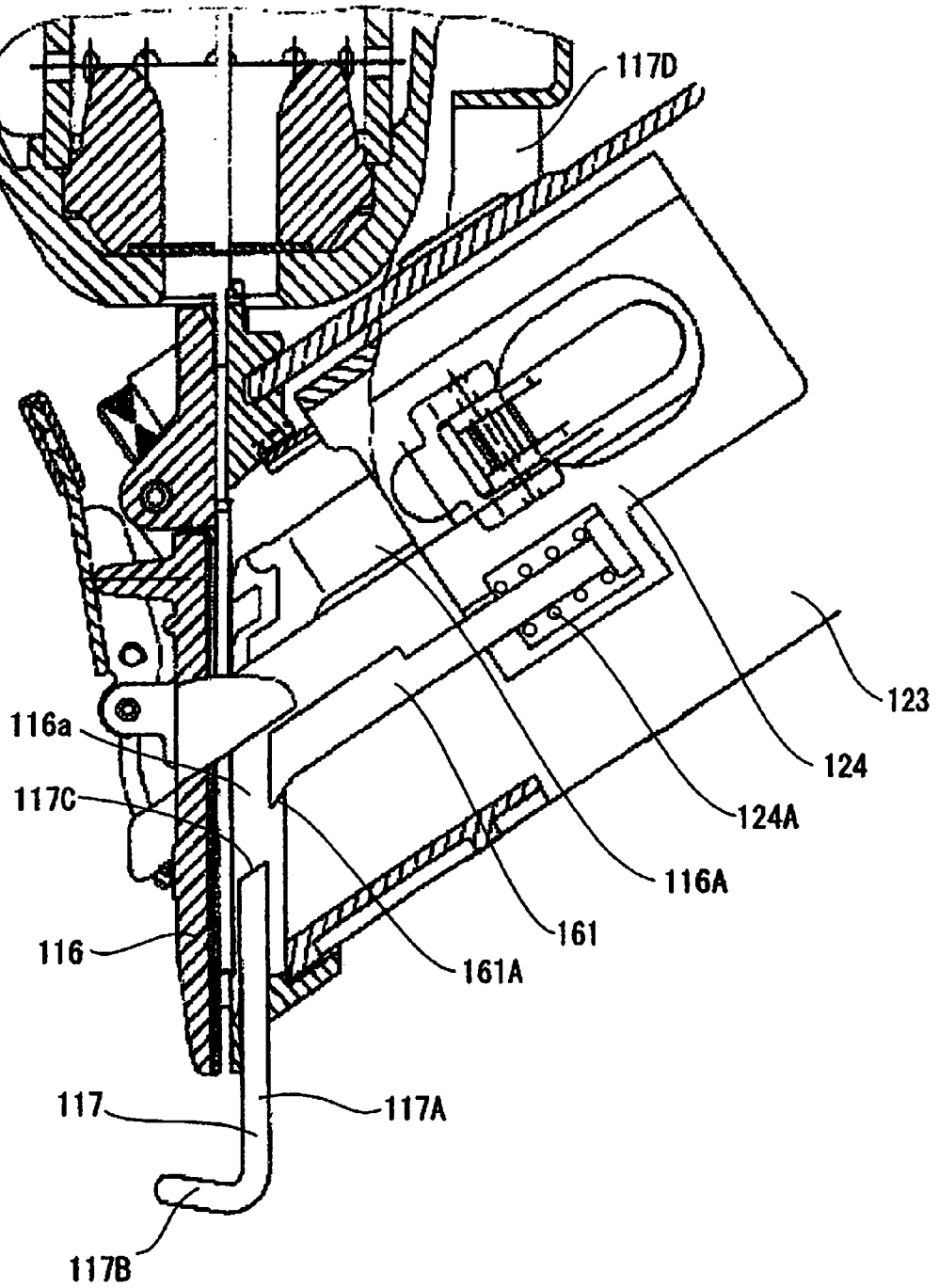
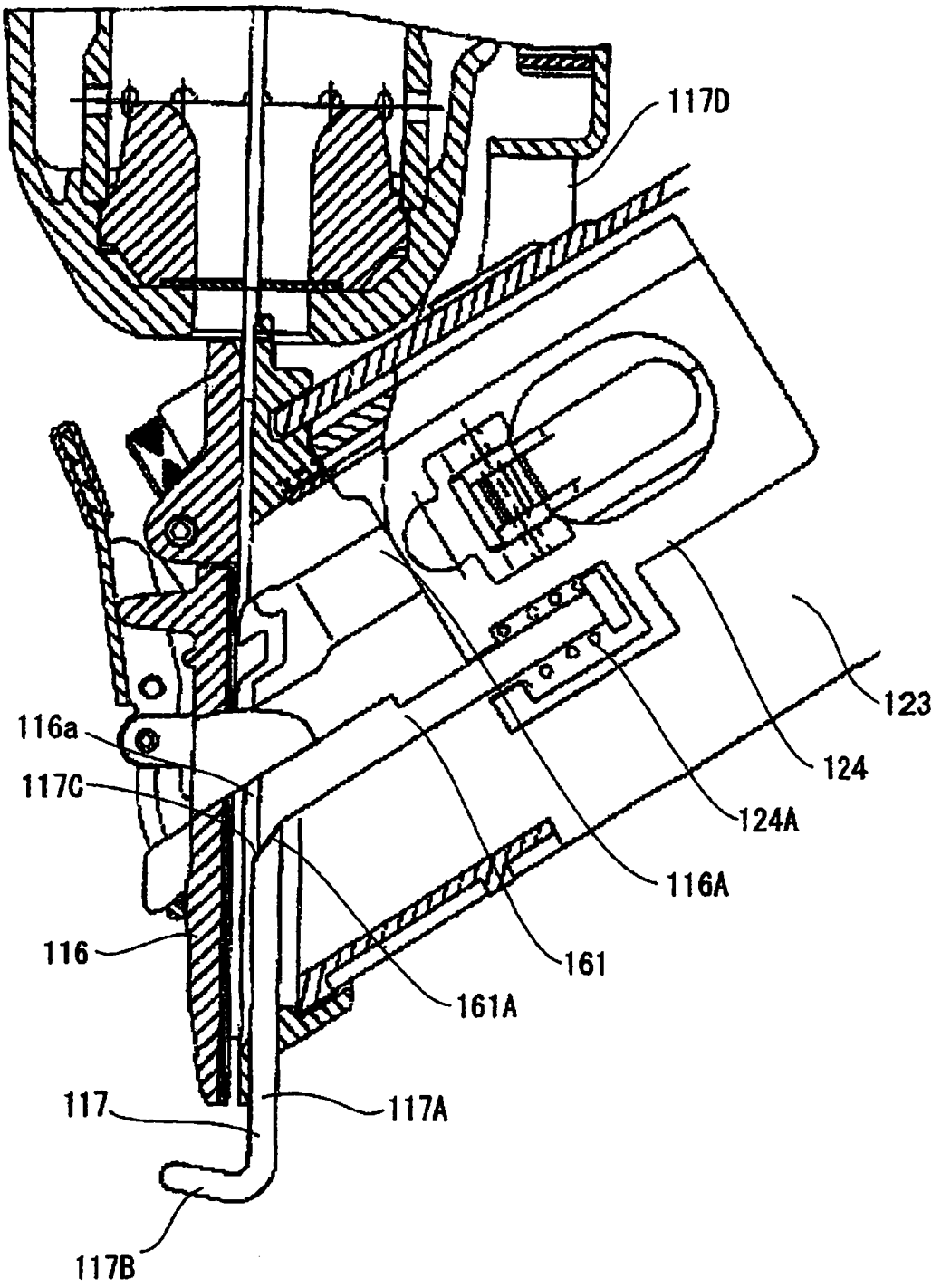


FIG. 8



NAILING MACHINE

TECHNICAL FIELD

The present invention relates to a nailing machine.

BACKGROUND ART

A nailing machine, such as a nail gun, starts operation by means of synergistic combination of operation for activating a trigger placed in the vicinity of a handle and operation for pressing a lower end of a start lever located in the vicinity of an ejection section at an exit, from which a fastener such as a nail is fired, against a material subject to driving action (hereinafter called simply a "material"), such as wood. A nail in the ejection section is fired from the ejection section. The lower end of the start lever is located in the vicinity of the ejection section and pressed toward a bottom dead center by means of a spring that is supported so as to be movable between the bottom dead center at a leading end of the ejection section and the top dead center at a base end of the ejection section. Before operation of the nailing machine, the start lever is situated at the bottom dead center.

When driving operation is performed while nails are empty, the life of the nail gun is shortened, and an impact mark resultant from firing of a nail may also be left on the material, which will impair a finish. As described in Japanese Patent Number 3209032, in order to prevent such no-load firing operation, a protuberance provided at a leading end of a feeder that feeds nails to the ejection section is engaged with an engagement section of the start lever located at the bottom dead center when nails in a magazine becomes empty or comes to a predetermined number or less, thereby hindering movement of the start lever to the top dead center. The nail gun is configured such that, when movement of the start lever to the top dead center is hindered, the gun cannot be activated.

However, in the configuration described in connection with Japanese Patent Number 3209032, the amount of engagement of the engagement section with the protuberance provided at the leading end can be ensured merely to an extent that is equal to or smaller than the width of a nail. Therefore, in the case of a nail having a small width, such as a finishing nail, a sufficient amount of engagement cannot be ensured, and there has arisen a case where a no-load firing prevention mechanism fails to operate at a predetermined number of nails.

A configuration described in connection with Japanese Patent Number 3209032 is directed toward a complicate structure, wherein the width of a nail is amplified, to thus increase an amount of engagement of the protuberance located at the leading end with the engagement member. However, nails are mass-produced and involve many errors in width, and hence the errors are also amplified. When control is performed on a per-nail basis, faulty operation arises, which sometimes results in occurrence of no-load firing.

DISCLOSURE OF INVENTION

The present invention aims at providing a nailing machine that prevents occurrence of no-load firing without fail by means of a simple structure.

In order to solve the problem, the present invention provides a nailing machine including: a housing; an ejection section that is provided at an end of the housing and that defines a path through which a blade passes; an activation lever that is provided at a leading end of the ejection section to be movable inside a traveling course; a magazine that holds a plurality of nails; a feeder that urges the plurality of nails to feed the nails into the path of the ejection section; and an engagement member that is engaged with the feeder so that, when an amount of remaining nails becomes to a predetermined number, the engagement member is moved toward a first direction to protrude into the traveling course from outside thereof; wherein one of the activation lever and the engagement member includes a slope portion; and wherein the slope portion is configured so that the activation lever and the engagement member are slidably contact with each other and the engagement member is further moved toward the first direction.

According to such a configuration, the activation lever and the engagement member engage with each other by means of the slopes. Subsequently, the depth of engagement corresponding to the amount of engagement of the engagement member with the activation lever is increased with an increase in the amount of travel of the activation lever in the one direction, thereby preventing disengagement of the activation lever from the engagement member.

The engagement member may be installed in the ejection section and urged to a second direction opposite to the first direction. When the amount of remaining nails becomes the predetermined number, the feeder may contact the engagement member and the engagement member may be protruded into the traveling course.

According to such a configuration, the ejection section holds the engagement member. The ejection section must support the activation lever, and the like, and hence has rigidity. Therefore, the ejection section can hold the engagement member by means of an area exhibiting high rigidity. As a result, the engagement member can be supported reliably. When moved by the feeder, the engagement member can move over the traveling course accurately.

The engagement member may be installed in the feeder to be movable with the feeder and urged to a second direction opposite to the first direction.

According to such a configuration, since the engagement member moves along with the feeder that urges a nail, the position of the nail that is moved by the feeder and the position of the engagement member can be accurately matched with each other.

Moreover, in order to solve the problem, the present invention provides a nailing machine including: a housing; an ejection section that is provided at an end of the housing and that defines a path through which a blade passes; an activation lever that is provided at a leading end of the ejection section to be movable inside a traveling course; a magazine that holds a plurality of nails; a feeder that urges the plurality of nails to feed the nails into the path of the ejection section; and an engagement member that is engaged with the feeder so that, when an amount of remaining nails becomes to a predetermined number, the engagement member is moved toward a first direction to protrude into the traveling course from outside thereof; wherein, when the amount of remaining nails becomes to the predetermined number, the activation lever and the engagement member contact with each other and an engagement therebetween increases.

INDUSTRIAL APPLICABILITY

According to the nailing machine of the present invention, no-load firing operation can be prevented without fail by means of a simple structure.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a cross-sectional view of a nail gun of a first embodiment.

FIG. **2** is a detailed cross-sectional view of a periphery of an ejection section of the nail gun of the first embodiment.

FIG. **3** is a cross-sectional view taken along line III-III in FIG. **2**.

FIG. **4** is a detailed cross-sectional view of a periphery of the ejection section of the nail gun of the first embodiment (when a first slope and a second slope remain in contact with each other).

FIG. **5** is a detailed cross-sectional view of the periphery of the ejection section of the nail gun of the first embodiment (when the depth of engagement of an engagement section with an activation member is increased).

FIG. **6** is a cross-sectional view of a nail gun of a second embodiment.

FIG. **7** is a detailed cross-sectional view of a periphery of an ejection section of the nail gun of the second embodiment.

FIG. **8** is a detailed cross-sectional view of the periphery of the ejection section of the nail gun of the second embodiment (when the depth of engagement of an engagement section with an activation member is increased).

BEST MODE FOR CARRYING OUT OF THE INVENTION

A nailing machine of a first embodiment of the present invention will now be described hereunder by reference to FIGS. **1** through **5**. A nail gun **1** is a combustion nail gun that performs nailing by means of taking gas as fuel; and has a housing **2** as an outer envelope. The housing **2** has a housing main body **2**A; a gas cylinder housing **2**B located on the side of the housing main body **2**A; and a handle **3** extending from the gas cylinder housing **2**B. A chamber head **5** is disposed at a position located too close to one end within the housing main body **2**A. The chamber head **5** supports a motor **6** and an ignition plug **7** serving as ignition means. A head seal **8** is fitted on an outer peripheral surface of the chamber head **5**. Moreover, a combustion gas channel is opened in the chamber head **5**.

A cylinder **9** is fastened to a position in the housing main body **2**A opposite to the motor **6**, and a cylinder seal **10** is fitted to an outer peripheral surface of one side of the cylinder **9**. A piston **11** serving as a power unit is provided in the cylinder **9** so as to be reciprocally slidable with respect to the cylinder **9**. A driver blade **12** for driving a nail serving as a fastener extends from the piston **11** to the other side of the housing main body **2**A.

A combustion chamber frame **13** capable of moving in an axial direction of the cylinder **9** is provided in the housing main body **2**A. An internally peripheral surface of the combustion chamber frame **13** is sealed by the head seal **8** and the cylinder seal **10** in accordance with a traveling position of the combustion chamber frame **13**. When the combustion chamber frame **13** moves toward one end of the housing main unit **2**A, to thus stay at the chamber head **5**, a combustion chamber **14** is defined by means of the chamber head **5**, the combustion chamber frame **13**, and one end face of the piston **9** by way of the head seal **8** and the cylinder seal **10**. The ignition plug **7** and an open end of the combustion gas channel face the combustion chamber **14**. A fan **15** fastened to a rotary shaft of the motor **6** is rotatably positioned in the combustion chamber **14**.

As shown in FIGS. **1** and **2**, an ejection section **16** that defines a path for enabling passage of the driver blade **12** in order to transmit power of the drive blade **12** to a nail and a magazine **23** that holds a plurality of nails to be impacted by the driver blade **12** and that feeds a nail to the path of the ejection section **16** are provided on the other end of the housing main body **2**A.

A path **16***a* (FIG. **3**) through which an activation member **17** to be described later moves and that serves as a traveling course and has an essentially-U-shaped cross-sectional profile is opened in the ejection section **16**, and an engagement member **61** and the activation member **17** are movably supported by the ejection section. As shown in FIG. **2**, the engagement member **61** is arranged in a hole orthogonal to the path **16***a* of the ejection section **16**, so as to be movable in only the direction orthogonal to the path **16***a*. A first slope **61**A is provided at a leading end of the engagement member facing the path **16***a*. The first slope **61**A is configured in such a way that a vector normal to the first slope turns into a resultant vector formed by combination of a vector extending from a base end of the ejection section **16** to the leading end thereof and a vector extending from the leading end of the engagement member **61** to a rear end thereof. A spring **16**B is interposed between the ejection section **16** and the engagement member **61**, and the engagement member **61** is urged by the spring **16**B so as to depart from the path **16***a*. The slope **61** is situated outside the path **16***a*, unless the engagement member **61** is pressed so as to approach the path **16***a*.

The activation member **17** is primarily made up of a shaft **17**A and a contact section **17**B that is located at the leading end of the ejection section **16** and comes into contact with a material, and the shaft **17**A is placed in the path **16***a* in a movable manner. As shown in FIG. **3**, the shaft **17**A is made from a steel product, such as a music wire having an essentially-circular cross-sectional profile, and is formed so as to assume a diameter that is slightly smaller than an inner diameter of the path **16***a*.

As shown in FIG. **2**, a second slope **17**C is provided at a rear end of the shaft **17**A (the base end of the ejection section **16**). The second slope **17**C is formed in such a way that a vector normal to the second slope turns into a resultant vector formed by combination of a vector extending from the leading end of the ejection section **16** to the base end thereof and a vector extending from the rear end of the engagement member **61** to the leading end thereof. Consequently, in a state where the first slope **61**A is in the path **16***a*, the second slope **17**C can come into a surface contact with the first slope **61**A, and the respective normal directions of the first and second slopes cross the traveling course of the activation member **17** serving as a start lever. Further, the foregoing combustion chamber frame **13** is connected to the activation member **17** and configured in such a way that the combustion chamber frame **13** travels from the bottom dead center to the top dead center in conjunction with the travel of the activation member **17** from the position of the leading end to the position of the base end.

The magazine **23** is connected to the ejection section **16** and, further, to the handle **3**. The magazine **23** is equipped with a feeder **24** for urging a nail toward the ejection section **16** and an unillustrated spring for urging the feeder **24**. The feeder **24** is urged by the unillustrated spring, whereby a nail is fed to the ejection section **16**. A claw **16**A is provided at a base end of the feeder **24** facing the ejection section **16**, and a nail is urged by means of the claw **16**A. In the feeder **24**, a contact section **24**B capable of contacting the rear end of the engagement member **61** is defined in the vicinity of a base of the claw **16**A. When the number of remaining nails comes to zero or a predetermined number that is greater than one, the contact section contacts the engagement member **61**, thereby causing the first slope **61**A to travel over the path **16***a*.

A gas cylinder **18** that stores fuel gas and that has a nozzle **18**A is housed in the gas cylinder housing **2**B. The nozzle **18**A is provided in a fuel channel of the chamber head **5** so as to be able to selectively establish mutual communication. The

nozzle is provided with an unillustrated cam that presses the gas cylinder **18** when the activation member **17** undergoes lifting force. When the gas cylinder **18** is pressed by the cam, the fuel gas from the nozzle **18**A is injected into the combustion chamber **14** by way of the fuel gas channel.

The handle **3** is equipped with a trigger **19** in such a way that the trigger can be actuated by a finger, and a spark switch **20** connected to the ignition plug **7** is provided in the handle **3**. A removable cell **21** is fitted in an internal space on a free-end side of the handle **3**, and the cell **21** is connected to the spark switch **20** and the motor **6** by way of a wire **22**.

In the foregoing configuration, when the combustion chamber frame **13** is situated at the bottom dead center, the combustion chamber frame **13** remains out of contact with the head seal **8** and the cylinder seal **10**, and the internal space of the combustion chamber frame **13** is in connection with the outside. When the activation member **17** is brought into contact with the material in this state, to thus press the nail gun **1** toward the material, the combustion chamber frame **13** travels to the chamber head **5**, whereupon the combustion chamber frame **13** comes into close contact with the head seal **8** and the cylinder seal **10**, thereby defining the combustion chamber **14** cut off from outside air. When the combustion chamber frame **13** ascends to a predetermined position, an unillustrated sensor detects arrival of the combustion chamber frame to the position and rotates the fan **15**. By means of the lifting force of the activation member **17**, the unillustrated cam pushes the gas cylinder **18**, whereupon the fuel gas is emitted into the combustion chamber **14** from the nozzle **18**A.

When the trigger **19** is pulled while the chamber **4** stays at the top dead center, the spark switch **20** is turned on, whereupon a spark develops from the ignition plug **7**. Therefore, the combustion gas is ignited in the combustion chamber **14**, and the gas causes combustion and explosion, thereby urging the piston **9** toward the ejection section **16**. Thus, the driver blade **12** impacts a nail situated at the ejection section **16**, whereupon the nail is driven into the material.

When a nail is driven into the material, a new nail is fed into the ejection section **16** by means of the feeder **24**, whereby nailing is newly performed. However, if nailing is performed when the number of nails still remaining in the magazine **23** came to zero, an impact mark of the driver blade **12** will sometimes be left on the material. In order to avoid generation of such a mark, when the number of remaining nails come to a predetermined number, the feeder **24** presses the engagement member **61**, thereby moving the first slope **61**A onto the path **16***a*. As a result, even when the activation member **17** is pressed against the material, the second slope **17**C comes into contact with the first slope **61**A, thereby preventing movement of the activation member **17** toward the base end. As a result, the combustion chamber frame **13** does not ascend to the predetermined position, and emission of gas from the gas cylinder **18** is inhibited.

As shown in FIG. **4**, the engagement member **61** and the activation member **17** contact each other by means of the first slope **61**A and the second slope **17**C. The activation member **17** moves toward the base end, to thus impel the first slope **61**A by means of the second slope **17**C, whereupon reactive force arises in the engagement member **61** in the direction of the normal. Since the engagement section **61** is incapable of moving in the direction where the activation member **17** moves (i.e., toward the path **16***a*), force develops, as a component of counterforce in the normal direction, in a direction where the engagement section **61** advances toward the path **16***a*, whereupon the engagement member **61** further moves in a direction toward the path **16***a* (FIG. **5**). As a result of the engagement member **61** further moving toward the path **16***a*, an overlapping area between the first slope **61**A and the second slope **17**C becomes greater as shown in FIG. **5**. Therefore, the depth of engagement between the engagement member **61** and the activation member **17** is increased. Accordingly, even when engagement of the activation member **17** with the engagement member **61** is small at the outset (D in FIG. **4**), the depth of engagement with the engagement member **61** is increased by movement of the activation member **17** toward the base end (D' in FIG. **5**), thereby hindering movement of the activation member **17** toward the base end, which would otherwise be caused when the activation member **17** is disengaged from the engagement member **61**.

In the nail gun **1** of the first embodiment, the engagement member **61** is held by the ejection section **16**. Since the ejection section **16** must support the activation member **17** or the like, the ejection section has rigidity and can hold the engagement member **61** by means of an area exhibiting high rigidity. Thereby, the engagement member **61** can be supported reliably. When the engagement member **61** is moved by the feeder **24**, the first slope **61**A can be moved over the path **16***a* accurately.

A nailing machine of the second embodiment of the present invention will now be described by reference to FIGS. **6** through **8**. A nail gun shown in FIG. **6** is a pneumatic nail gun that performs nailing by means of taking compressed air as power. A housing **102** and a handle **103** located at one side of the housing **102** are provided integrally in the nail gun. Compressed air from an unillustrated compressor is accumulated, by way of an unillustrated air hose, in a pressure accumulation chamber **103***a* formed in the handle **103** and the housing **102** of the nail gun **101**. A cylindrical cylinder **109** is provided in the housing **102**, and a piston **111** is provided in the cylinder **109** so as to become vertically slidable. A driver blade **112** is formed integrally on the piston **111**, and a nail is driven by the driver blade **112**.

A pneumatic chamber **102***a* for accumulating compressed air for returning the driver blade **112** to the top dead center is provided at a lower-end outer periphery of the cylinder **109**. A non-return valve **102**A is provided at the center of the cylinder **109** in an axial direction thereof, thereby creating an air path for circulating an air in only one direction from the inside of the cylinder **109** to the pneumatic chamber **102***a* outside the cylinder **109**. Further, an air path normally opened to the pneumatic chamber **102***a* is formed below the cylinder **109**.

A trigger **119** and a trigger valve **119**A are provided at a base of the handle **103**. An urging section **117**D to be described later is provided in the vicinity of the trigger **119**. The trigger valve **119**A is placed at a location in the base of the handle **103** opposing the trigger **119**. The trigger valve **119**A has a plunger **119**B that is pushed as a result of the trigger **119** being pulled, to thus release the path in the trigger valve **119**A and enable supply of compressed air to a main valve section **106** to be described later.

The plunger **119**B is built so as to be lifted both when the trigger **119** is impelled by the urging section **117**D as a result of the activation member **117** being pressed against the material and when the trigger **119** is pulled.

The main valve section **106** is provided on an upper outer periphery of the cylinder **109**. The main valve section **10** is equipped with a main valve **106**A, and a sealed space is defined at a position above the piston **111** by means of synergistic operation of the main valve **106**A and the cylinder **109**. Therefore, the main valve section **106** is configured so as to be able to supply the compressed air discharged from the trigger valve **109**A into the space.

An unillustrated path for enabling passage of the driver blade **112** is opened in an ejection section **116** shown in FIG.

7, and the ejection section **116** has a magazine **123** that holds a plurality of nails to be driven by the driver blade **112** and that feeds the nail to the path of the ejection section **116**.

A path **116***a* extending essentially in parallel to the unillustrated path is opened in the ejection section **116**. The activation member **117** is movably supported in the path **116***a*. The activation member **117** is made up of a shaft **117**A inserted into the path **116***a*; a contact **117**B that is located at the leading end of the shaft **117**A and that contacts the material; and an urging section **117**D that is situated above the ejection section **116** while being connected to the shaft **117**A and that can impel the trigger **119** as mentioned previously. A second slope **117**C is provided on a rear end (a base end of the ejection section **116**) of the shaft **117**A that serving as the other end of the shaft **117**A. The second slope **117**C is formed in such a way that a vector normal to the second slope turns into a resultant vector formed by combination of a vector extending from the leading end of the ejection section **116** to the base end thereof and a vector extending from the rear end of the engagement member **161** to the leading end thereof.

The magazine **123** is connected to the handle **103** as well as to the ejection section **116**. The magazine **123** is provided with a feeder **124** for urging a nail toward the ejection section **116** and an unillustrated spring that impels the feeder **124**. A nail is fed to the ejection section **116** as a result of the feeder **124** being impelled by the unillustrated spring. A claw **116**A is provided at an end of the feeder **124** facing the ejection section **116**, and the claw **116**A forces a nail. Further, an engagement member **161** is disposed in the vicinity of the claw **116**A in the feeder **124**.

The engagement member **161** is provided on the feeder **124**; extends in the same direction where the feeder **124** is urged; and is configured so as to be able to move in the same direction where the feeder **124** is urged. A spring **124**A is interposed between the engagement member **161** and the feeder **124**. The engagement member **161** is urged by the spring **124**A in a direction opposite to the direction where the feeder **124** is impelled (a direction from the feeder **124** toward the path **116***a*). A first slope **161**A is placed at the leading end of the engagement member **161** that faces the path **116***a* and that comes to a position above the path **116***a* when the number of nails in the magazine **123** comes to a predetermined number for preventing no-load firing. The first slope **161**A is formed in such a way that a vector normal to the first slope turns into a resultant vector formed by combination of a vector extending from the base end of the ejection section **116** to the leading end thereof and a vector extending from the leading end of the engagement member **161** to the rear end thereof.

In the above configuration, in a case where the urging section **117**D is situated at a low position, the plunger **119**B is not pushed even when the trigger **119** is pulled, and hence the nail gun **101** does not operate. When the activation member **117** is brought into contact with the material in this state and when the nail gun **101** is pressed toward the material, the urging section **117**D moves upward, thereby urging the trigger **119**. When the trigger **119** is pulled in this state, the plunger **119**B is pushed, to thus release the path in the trigger valve **119**A, whereupon compressed air is delivered to the main valve section **106**. The main valve **106**A is actuated by the compressed air, so that an airtight chamber is created at a position above the piston **111** within the cylinder **109**. The compressed air flows into the airtight chamber, whereby the piston **111** rapidly moves to the bottom dead center and a nail in the ejection section **116** is driven into the material by the driver blade **112**.

Even in the second embodiment, when the number of remaining nails comes to a predetermined number, as in the first embodiment the first slope **161**A and the second slope **117**C contact each other as shown in FIG. **8** in order to prevent occurrence of no-load firing operation. In relation to the first slope **161**A and the second slope **117**C of the second embodiment, slippage arises between the first slope **161**A and the second slope **117**C as in the first embodiment, whereupon the activation member **117** (the shaft **117**A) moves from the leading end toward the base end. As a result, an overlapping area between the first slope **161**A and the second slope **117**C becomes greater, whereby the depth of engagement of the engagement member **161** with the activation member **117** is increased. Consequently, movement of the activation member **117** toward the base end, which would otherwise be caused when the activation member is disengaged from the engagement member **161**, is prevented.

In the nail gun **101** of the second embodiment, the engagement member **161** moves along with the feeder **124** that feeds a nail. Hence, a nail that is moved by the feeder **124** and the position of the engagement member **161** can be accurately matched with each other. Consequently, the position of a nail that is prevented from being subjected to no-load firing and the position of the engagement member **161** can be reliably brought into agreement with each other.

In any of the embodiments, the depth of engagement of the engagement member with the activation member is increased by movement of the engagement member. However, an increase in the depth of engagement is not achieved solely by this method. The depth of engagement may also be increased by making the activation member movable or making both the engagement member and the activation member movable.

The present invention is described in connection with the nailing machine of the first embodiment where a flammable gas is taken as power and the nailing machine of the second embodiment where air is taken as power. However, the present invention is not limited to these embodiments and can also be applied to a nailing machine that takes a motor or a solenoid as a power source or that takes explosion force of an explosive as power.

The invention claimed is:

1. A nailing machine comprising:

a housing;

an ejection section that is provided at an end of the housing and that defines a path through which a blade passes;

an activation lever that is provided at a leading end of the ejection section to be movable inside a traveling course;

a magazine that holds a plurality of nails;

a feeder that urges the plurality of nails to feed the nails into the path of the ejection section; and

an engagement member that is engaged with the feeder so that, when an amount of remaining nails becomes to a predetermined number, the engagement member is moved toward a first direction to protrude into the traveling course from outside thereof;

wherein one of the activation lever and the engagement member includes a slope portion; and

wherein the slope portion is configured so that the activation lever and the engagement member are slidably contact with each other and the engagement member is further moved toward the first direction.

2. The nailing machine according to claim **1**,

wherein the engagement member is installed in the ejection section and urged to a second direction opposite to the first direction; and

wherein, when the amount of remaining nails becomes the predetermined number, the feeder contacts the engagement member and the engagement member is protruded into the traveling course.

3. The nailing machine according to claim **1**,

wherein the engagement member is installed in the feeder to be movable with the feeder and urged to a second direction opposite to the first direction.

4. A nailing machine comprising:

a housing;

an ejection section that is provided at an end of the housing and that defines a path through which a blade passes;

an activation lever that is provided at a leading end of the ejection section to be movable inside a traveling course;

a magazine that holds a plurality of nails;

a feeder that urges the plurality of nails to feed the nails into the path of the ejection section; and

an engagement member that is engaged with the feeder so that, when an amount of remaining nails becomes to a predetermined number, the engagement member is moved toward a first direction to protrude into the traveling course from outside thereof;

wherein, when the amount of remaining nails becomes to the predetermined number, the activation lever and the engagement member contact with each other and an engagement therebetween increases.

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